WHAT IS CLAIMED IS:

1. An apparatus for measuring liquid level in a container which comprises in combination:
   (a) a transducer in physical contact with the outside of a wall of the container located below the surface of the liquid for generating at least two acoustic resonance responses in the liquid substantially perpendicular to the surface;
   (b) a sweep generator for electrically exciting said transducer over a chosen range of acoustical frequencies and having a chosen waveform; and
   (c) a receiver for measuring the acoustic frequencies for at least two resonant responses.
2. The apparatus for measuring liquid level in a container as described in claim 1, wherein the chosen waveform comprises a sine wave.
3. The apparatus for measuring liquid level in a container as described in claim 2, wherein the at least two resonant responses are analyzed by Fast Fourier Transform procedures.
4. The apparatus for measuring liquid level in a container as described in claim 1, wherein the chosen range of acoustical frequencies includes at least one acoustic wall resonance.
5. The apparatus for measuring liquid level in a container as described in claim 1, wherein the chosen waveform comprises a continuous frequency modulated waveform voltage excitation, $V(t)$, having the form: $V(t) = \sin\left(2\pi\left(f_o + \frac{1}{2}\alpha t\right)t\right)$, where t is the time, f_0 is the initial frequency of the swept waveform, and α is related to the rate of change of the instantaneous frequency.
6. An apparatus for measuring liquid level in a container which comprises in combination:
   (a) means in physical contact with the outside of a wall of the container located below the surface of the liquid for generating at least two

acoustic resonance responses in the liquid substantially perpendicular to the surface, and for determining the acoustic frequencies of at least two resonant responses; and

(b) means for electrically exciting said means for generating at least two acoustic resonance responses over a chosen range of acoustical frequencies and having a chosen waveform.

7. The apparatus for measuring liquid level in a container as described in claim 6, wherein said means for generating at least two acoustic resonance responses and for determining the acoustic frequencies of at least two resonant responses comprises an acoustic transducer and an acoustic receiver.

8. The apparatus for measuring liquid level in a container as describe in claim 6, wherein said means for electrically exciting said means for generating at least two acoustic resonance responses comprises a sweep generator.

9. The apparatus for measuring liquid level in a container as described in claim 6, wherein the chosen waveform comprises a sine wave.

10. The apparatus for measuring liquid level in a container as described in claim 9, wherein the at least two resonant responses are analyzed by Fast Fourier Transform procedures.

11. The apparatus for measuring liquid level in a container as described in claim 6, wherein the chosen range of acoustical frequencies includes at least one acoustic wall resonance.

12. The apparatus for measuring liquid level in a container as described in claim 6, wherein the chosen waveform comprises a continuous frequency modulated waveform voltage excitation, $V(t)$, having the form: $V(t) = \sin\left(2\pi\left(f_o + \frac{1}{2}\alpha t\right)t\right)$, where t is the time, f_0 is the initial frequency of the swept waveform, and α is related to the rate of change of the instantaneous frequency.

13. A method for measuring liquid level in a container which comprises the steps of:

(a) generating at least two acoustic resonances in the liquid substantially perpendicular to the surface of the liquid; and

(b) determining the frequency of at least two acoustic resonances.

14. The method for measuring liquid level in a container as described in claim 13, wherein the acoustic resonances are generated using a waveform comprising a sine wave.

15. The method for measuring liquid level in a container as described in claim 14, wherein the sine wave is swept over frequencies comprising at least one acoustic wall resonance of a wall of the container perpendicular to the surface of the liquid.

16. The method for measuring liquid level in a container as described in claim 13, wherein the acoustic resonances are generated using a waveform comprising a continuous frequency modulated waveform voltage excitation, $V(t)$, having the form: $V(t) = \sin\left(2\pi\left(f_o + \frac{1}{2}\alpha t\right)t\right)$, where t is the time, f_0 is the initial frequency of the swept waveform, and α is related to the rate of change of the instantaneous frequency.

17. An apparatus for measuring liquid level in a container which comprises in combination:

    (a) a transducer in physical contact with the outside of a wall of the container located below the surface of the liquid for generating acoustic resonance responses in the liquid substantially parallel to the surface;

    (b) a generator for electrically exciting said transducer; and

    (c) a receiver for detecting the presence of resonant responses from the liquid.

18. An apparatus for measuring liquid level in a container which comprises in combination:

    (a) means in physical contact with the outside of a wall of the container located below the surface of the liquid for generating acoustic resonance responses in the liquid substantially parallel to the surface, and for detecting resonant responses; and

    (b) means for electrically exciting said means for generating acoustic resonance responses.

19. An apparatus for measuring liquid level in a container which comprises in combination:

(a) means in physical contact with the outside of a wall of the container located below the surface of the liquid for generating acoustic resonance responses in the liquid substantially parallel to the surface;

(b) means for electrically exciting said means for generating acoustic resonance responses; and

(c) means for detecting the presence of resonant responses from the liquid.

20. A method for measuring liquid level in a container which comprises the steps of:

(a) generating at least two acoustic resonances in the liquid substantially parallel to the surface of the liquid; and

(b) detecting the presence of acoustic resonances from the liquid.